

## CLAIMS:

1. A method of enhancing a resident population of microorganism in a selected site of the gastrointestinal tract of an animal, the method comprising providing to the animal a selected modified or unmodified resistant starch or mixtures thereof in combination with one or more probiotic microorganisms such that upon ingestion the starch passes through the gastrointestinal tract substantially unutilized until it reaches the selected site where it is utilised by the resident and/or the probiotic microorganisms thereof causing an increase in number and/or activity of the microorganisms.
2. A method of suppressing an undesired resident population of microorganism in a selected site of the gastrointestinal tract of an animal, the method comprising providing to the animal a modified or unmodified resistant starch or mixtures thereof in combination with one or more probiotic microorganisms such that upon ingestion the starch passes through the gastrointestinal tract substantially unutilized until it reaches the selected site where it is utilised by another resident and/or the probiotic microorganisms causing an increase in number and/or activity of the other microorganisms and suppressing the growth and/or activity of the undesired microorganism.
3. A method of reducing the incidence colorectal cancer or colonic atrophy in an animal, the method comprising providing to the animal one or more short chain fatty acid (SCFA) producing probiotic microorganisms and a carrier which will function to transport the one or more probiotic microorganisms to the large bowel or other regions of the gastrointestinal tract, the carrier comprising a modified or unmodified resistant starch or mixtures thereof, which carrier acts as a growth or maintenance medium for microorganisms in the large bowel or other regions of the gastrointestinal tract so as to enhance SCFA production by probiotic and/or resident microorganisms in the gastrointestinal tract of the animal.
4. The method according to claim 3 wherein the SCFA is butyrate and the probiotic and/or microorganisms in the gastrointestinal tract are *Cl. butyricum* and/or *Eubacterium*.
5. The method according to any one of claims 1 to 4 wherein the resistant starch is selected from high amylose starches and modified forms thereof.

6. The method according to claim 5 wherein the high amylose starch includes maize starch having an amylose content of 50% w/w or more.
7. The method according to claim 6 wherein the maize starch having an amylose content of 80% w/w or more.
- 5 8. The method according to claim 5 wherein the high amylose starch includes rice or wheat starch having an amylose content of 27% w/w or more.
9. The method according to claim 5 wherein the high amylose starch includes particular granular size ranges of starches having an amylose content of 50% or more with enhanced resistant starch content.
- 10 10. The method according to claim 5 wherein the high amylose starch from plants selected from the group consisting of maize, barley, wheat, rice, legumes, bananas, potatoes, and modified forms thereof.
11. The method according to any one of claims 5 to 10 wherein the resistant starch is modified chemically, enzymatically, and/or physically.
- 15 12. The method according to claim 10 wherein the chemical modification is by etherification, esterification, or acidification.
13. The method according to claim 11 wherein the physical modification is by crystallisation.
14. The method according to any one of claims 5 to 10 wherein the modified resistant starch is selected from the group consisting of hydroxypropylated starch, acetylated starch, octenyl succinated starch, carboxymethylated starch, and succinated starch.
- 20 15. The method according to any one of claims 1 to 14 wherein the growth and/or activity of the resident microorganisms is increased.
- 25 16. The method according to any one of claims 1 or 14 wherein the growth and/or activity of the probiotic microorganisms is increased.
17. The method according to any one of claims 15 or 16 wherein the selected site is the small intestine, stomach, or large bowel.
18. The method according to claim 2 wherein the undesired resident microorganism is a microbial pathogen.
- 30 19. The method according to claim 18 wherein the resistant starch acts as a carrier which will function to transport the one or more probiotic microorganisms to the selected site of the gastrointestinal tract, and which carrier acts as a growth or maintenance medium for the non-pathogenic microorganisms in the selected site of the gastrointestinal tract to an extent
- 35 sufficient to suppress growth and/or activity of the microbial pathogen.

20. An improved probiotic composition comprising one or more probiotic microorganisms and a carrier which will function to transport the one or more probiotic microorganisms to the large bowel or other regions of the gastrointestinal tract, the carrier comprising modified or unmodified resistant starch or mixtures thereof to which the probiotic microorganisms are bound in a manner so as to protect the microorganisms during passage to the large bowel or other regions of the gastrointestinal tract, which carrier acts as a growth or maintenance medium for microorganisms in the large bowel or other regions of the gastrointestinal tract.
21. The improved probiotic composition according to claim 20 wherein the probiotic microorganisms are bound irreversibly to the resistant starch.
22. The method according to claim 20 or 21 wherein the resistant starch is selected from high amylose starches and modified forms thereof.
23. The method according to claim 22 wherein the high amylose starch includes maize starch having an amylose content of 50% w/w or more.
24. The method according to claim 23 wherein the maize starch having an amylose content of 80% w/w or more.
25. The method according to claim 20 or 21 wherein the high amylose starch includes rice or wheat starch having an amylose content of 27% w/w or more.
26. The method according to claim 20 or 21 wherein the high amylose starch includes particular granular size ranges of starches having an amylose content of 50% or more with enhanced resistant starch content.
27. The method according to claim 20 or 21 wherein the high amylose starch from plants selected from the group consisting of maize, barley, wheat, rice, legumes, bananas, potatoes, and modified forms thereof.
28. The method according to any one of claims 20 to 27 wherein the resistant starch is modified chemically, enzymatically, and/or physically.
29. The method according to claim 28 wherein the chemical modification is by etherification, esterification, or acidification.
30. The method according to claim 28 wherein the physical modification is by crystallisation.
31. The method according to any one of claims 20 to 27 wherein the modified resistant starch is selected from the group consisting of hydroxypropylated starch, acetylated starch, octenyl succinated starch, carboxymethylated starch, and succinated starch.

32. An improved method of providing probiotic microorganisms to the gastrointestinal tract of an animal, the improved method comprising administering to the animal the improved probiotic composition according to any one of claims 20 to 31.

Year	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
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